FLUKE®

Instruction Manual

Model Y2022

Thermometer Calibration Divider

INTRODUCTION AND SPECIFICATIONS

Thermometer Calibration Divider Y2022 is an accessory for use in calibrating the Fluke 2180A and 2190A Digital Thermometers. It accepts input DC voltage from a voltage calibrator, and it divides that input by either 10 or 100, depending on the position of switch S1. The Y2022 allows use of a voltage calibrator output of sufficient magnitude to insure an adequate DC voltage to noise ratio. Maximum Divider input is 10V dc; maximum output is 1V dc in the ÷10 scale and 100 mV in the ÷100 scale. A 100Ω ±0.01% resistor is provided for use in calibrating the 2180A input card.

Specifications for the Y2022 Thermometer Calibration Divider are provided in Table 1.

Table 1. Specifications

Input Connections: Two, male banana plugs.
Output Connections: Four, screw terminal block - AWG 22-18.
Input Impedance: ÷ 10 scale - 1 kΩ; ÷ 100 scale - 10 kΩ.
Output Impedance: 100Ω.
Input Voltage: 0 - 10V dc.
Output Voltage: 0 - 1V dc.
Temperature Coefficient: ±15 ppm/°C from 25°C.
Stability: ±175 ppm in 90 days; ±200 ppm per year.
Dimensions: 9.14 cm x 4.42 cm x 2.65 cm (3.6 in x 1.74 in x 1.04 in)

INSTALLATION AND OPERATING INSTRUCTIONS

This section of the manual contains information regarding installation and operation of the Y2022 Thermometer Calibration Divider. It is recommended that the contents of this section be read and understood before any attempt is made to install or operate the module. Should any difficulties arise during operation, please contact your nearest Fluke Technical Service Center, or the John Fluke Mfg. Co., Inc.; P.O. Box 43210, Mountlake Terrace, WA 98043; telephone (206) 774-2211.

Shipping Information

Upon receipt, a thorough inspection should be made to reveal possible shipping damage. Special instructions for inspection and claims are included on the shipping container.

If reshipment is necessary, the original container should be used. If the original container is not available, a new one can be obtained from the John Fluke Mfg. Co., Inc. Please include the instrument model number when requesting a new shipping container.

Installation

To properly install the Y2022 Thermometer Calibration Divider for use in calibrating a 2180A or 2190A Digital Thermometer, connect the divider between the DC Voltage Calibrator and the Digital Thermometer as shown in Figure 1. Connections between the Divider and Thermometer should be made using stranded copper wire, size AWG 22 to AWG 18.

For precise, step by step Digital Thermometer calibration procedures using the Y2022 Divider, refer to Section 4 of the applicable Digital Thermometer manual.

NOTE

A 100Ω ±0.01% resistor is provided for use in adjusting R2 on the 2180A RTD Input Module. Connect the Divider as shown in Figure 2, DO NOT CONNECT THE DC VOLTAGE CALIBRATOR. Adjust R2 on the 2180A RTD Input Module for a 2180A indication of 0° C (+32° F).

THEORY OF OPERATION

Thermometer Calibration Divider Y2022 consists of two precision voltage divider circuits, switch selectable through S1. The ÷ 10 circuit is composed of potentiometer R1 (2 kΩ) and resistor R2 (32.4 kΩ) in parallel with resistor R3 (925Ω). When the ÷ 10 output is selected through S1, a voltage equal to one-tenth the input voltage is produced by this circuit. Potentiometer R1 provides the necessary calibration adjustment. A voltage equal to one one-hundredth of the input is produced through resistor R5 (909 kΩ) and potentiometer R4 (200 kΩ) in parallel with resistor R6 (10 kΩ). Potentiometer R4 provides the necessary adjustment. In addition to the voltage outputs, a fixed 100Ω ±0.01% resistor (R7) provides a means of calibrating the 2180A RTD Input Module without using an RTD probe and lag bath.

MAINTENANCE

WARNING

THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

INTRODUCTION

This section provides service, maintenance and calibration information. The calibration procedure must be performed each time a repair is made, or if the Thermometer Calibration Divider fails to meet accuracy standards during the Performance Test.

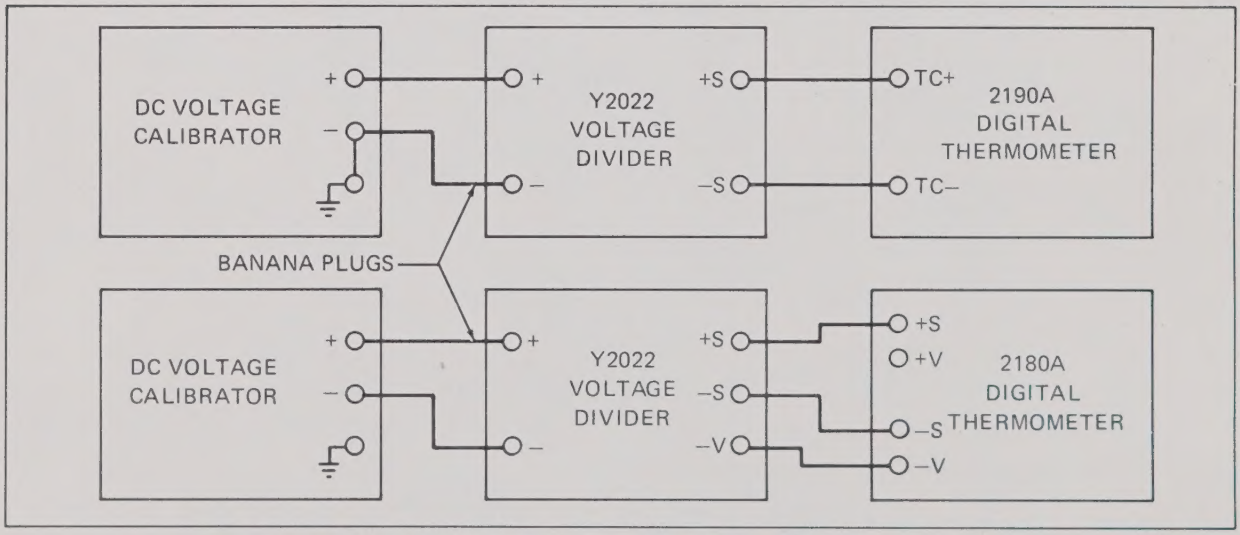

Figure 1. 2190A & 2180A Thermometer Calibration Divider Connections

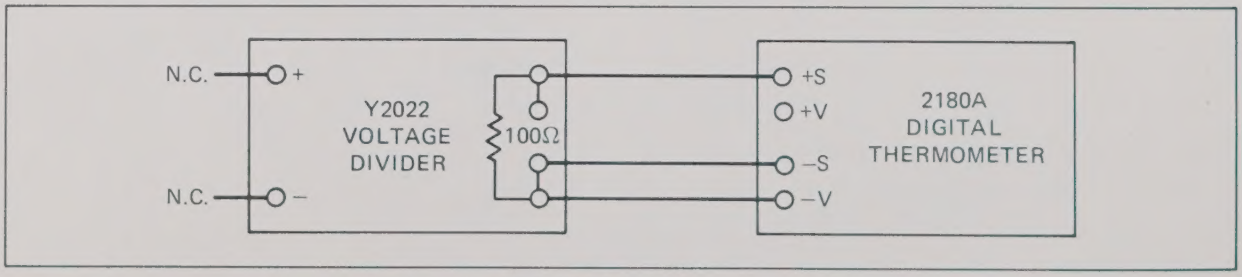

Figure 2. RTD Input Module Adjustment Connections

Service Information

The instrument is warranted for a period of 1 year upon delivery to the original purchaser. The WARRANTY is located on the back of the title page in the front of this manual.

Factory authorized calibration and service for each Fluke product is available at various worldwide locations. Contact your nearest Fluke Service Center or the John Fluke Mfg. Co., Inc. If requested, an estimate will be provided to the customer before work is begun on instruments that are beyond the warranty period.

General Maintenance

Clean the Thermometer Calibration Divider at regular intervals to remove dust, grease and other contamination. Use the following procedure:

CAUTION

Do not use aromatic hydrocarbons or chlorinated solvents for cleaning. They will react with plastic materials used in the manufacture of the instrument.

1. Remove the four screws in the bottom of the Y2022 Divider cover, and remove the pcb.

2. Use clean, dry air at low pressure (≤20 psi) to clean the pcb surface.

3. If grease is present, spray with Freon T.F. degreaser or anhydrous alcohol, then remove residue with clean, dry air.

PERFORMANCE TEST AND CALIBRATION

The following Performance Test should be performed prior to using the Y2022. Required test equipment consists of: a DC Calibrator, Fluke 343A or equivalent, and a Digital Multimeter, Fluke 8400A or equivalent.

1. Connect the Y2022 input to a Fluke 343A or equivalent DC Calibrator.

2. Connect the Y2022 output to a Fluke 8400A DMM or equivalent.

3. Set the calibrator output to 0 volts, the DMM to .1 volts DC with the filter on. Adjust the DMM zero, if necessary, to zero.

4. Change the DC Calibrator output to 10V dc, set S1 on the Y2022 to the ÷100 position. The DMM should indicate .10000, flickering between .09999 and .10001. To calibrate the Y2022, adjust the ÷100 CAL potentiometer for a DMM indication of .10000 ± flickering one digit.

5. Change the DMM range to 1.0V dc and Y2022 switch S1 to the ÷10 position. The DMM should indicate 1.00000, flickering between 0.99999 and 1.00001. To calibrate the Y2022, adjust the ÷10 CAL potentiometer for a DMM indication of 1.00000 ±1 flickering one digit.

TROUBLESHOOTING

Troubleshooting procedures detailed in Table 2 should be performed only after isolating a possible malfunction to the Divider. When a step in the table is completed, check for a decision transfer; if no decision is required, perform the next step in sequence.

HOW TO OBTAIN PARTS

This section contains an illustrated parts breakdown. Components are listed alphanumerically by assembly. Electrical and mechanical components are listed by reference designator Each listed part is shown in an accompanying illustration.

Parts may be ordered directly from the manufacturer by using the manufacturer's part number or from the John Fluke Mfg. Co., Inc. factory or authorized representative by using the FLUKE Stock Number. If an ordered part has been replaced by a new or improved part, the replacement will be accompanied by an explanatory note and installation instructions, if necessary.

To insure prompt, efficient handling of your order, include the following information:

1. Quantity.

2. FLUKE Stock Number.

3. Description.

4. Reference Designation.

5. Printed Circuit Board Part Number and Revision Letter.

6. Instrument Model and Serial Number.

Table 2. Troubleshooting Procedure

STEP NO.	ACTION	Go to the step number given for correct response	
		YES	NO
1	Remove the four screws in the bottom of the Divider Cover, and remove the cover.		
2	Connect the Divider to a DC Calibrator and DMM as detailed in the Performance Test.		
3	Does the ÷100 circuit meet the Performance Test and Calibration standards?	5	4
4	Check R4, R5 and R6.		
5	Does the ÷ 10 circuit meet the Performance Test and Calibration standards?	7	6
6	Check R1, R2 and R3.		
7	Is the resistance between +V, +S connections and −V, −S connections equal to 100Ω ±0.01%?	9	8
8	Check resistor R7.		
9	The Y2022 troubleshooting procedure is complete. Disconnect all test equipment.		

Table 3. Divider PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
	DIVIDER ASSEMBLY Y2022 FIGURE 3	490821	89536	490821			
H1	LOCKWASHER, SPLIT, #6	110692	73734	1358	2		
MP1	BRACKET	404525	89536	404525	2		
MP2	PLUG, BANANA	352716	83330	431	2		
MP3	DIVIDER BASE (NOT SHOWN)	490862	89536	490862	1		
R1	RES, VAR, 2K +/-20%, 300V	267864	32997	3009P-1-202	1		
R2	RES, MTL. FILM, 32.4K +/-1%, 1/8W	182956	91637	MFF1-83242F	1		
R3	RES, WW, 925 +/-0.01%, 1/4W	490789	89536	490789	1		
R4	RES, VAR, 200K +/-20%, 1/2W	381509	32997	3009P-1-204	1		
R5	RES, MTL. FILM, 909K +/-1%, 1/8W	288548	91637	MFF1-89093F	1		
R6	RES, WW, 10K +/-0.01%, 1/4W	491738	89536	491738	1		
R7	RES, WW, 100 +/-0.01%, 1/2W	491720	89536	491720	1		
S1	SWITCH, TOGGLE, DPDT, R-ANGLE	493692	95146	MTM206NRA	1		
TB1	BLOCK, TERMINAL, 4-CONT, 250 VRMS	479022	89536	479022	1		

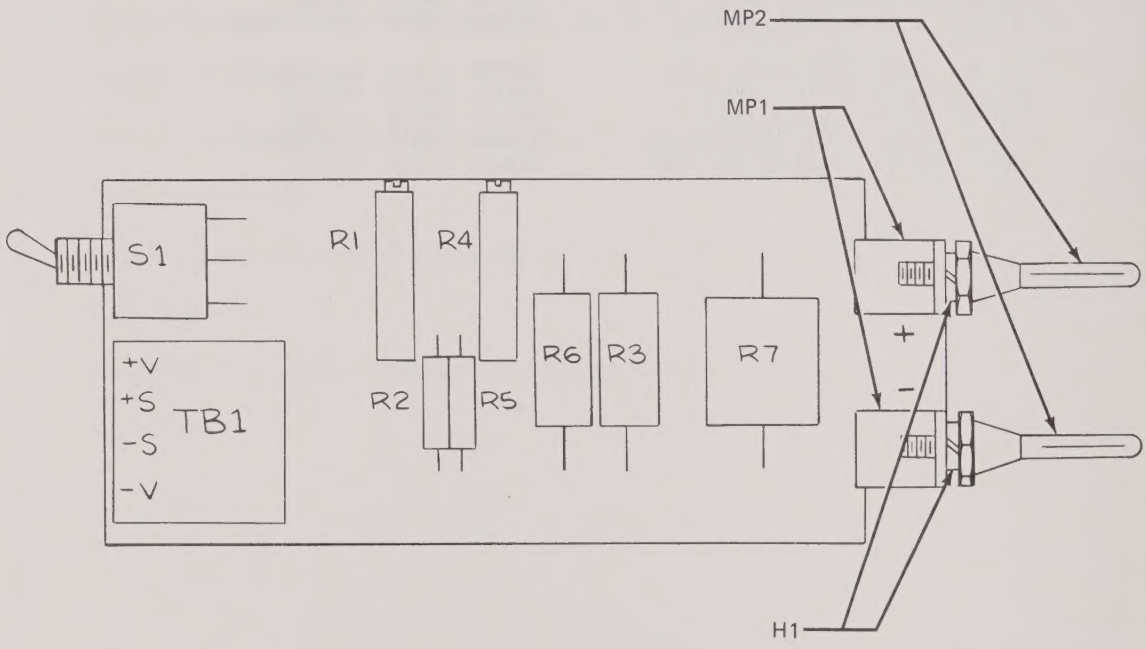

Figure 3. Divider PCB Assembly

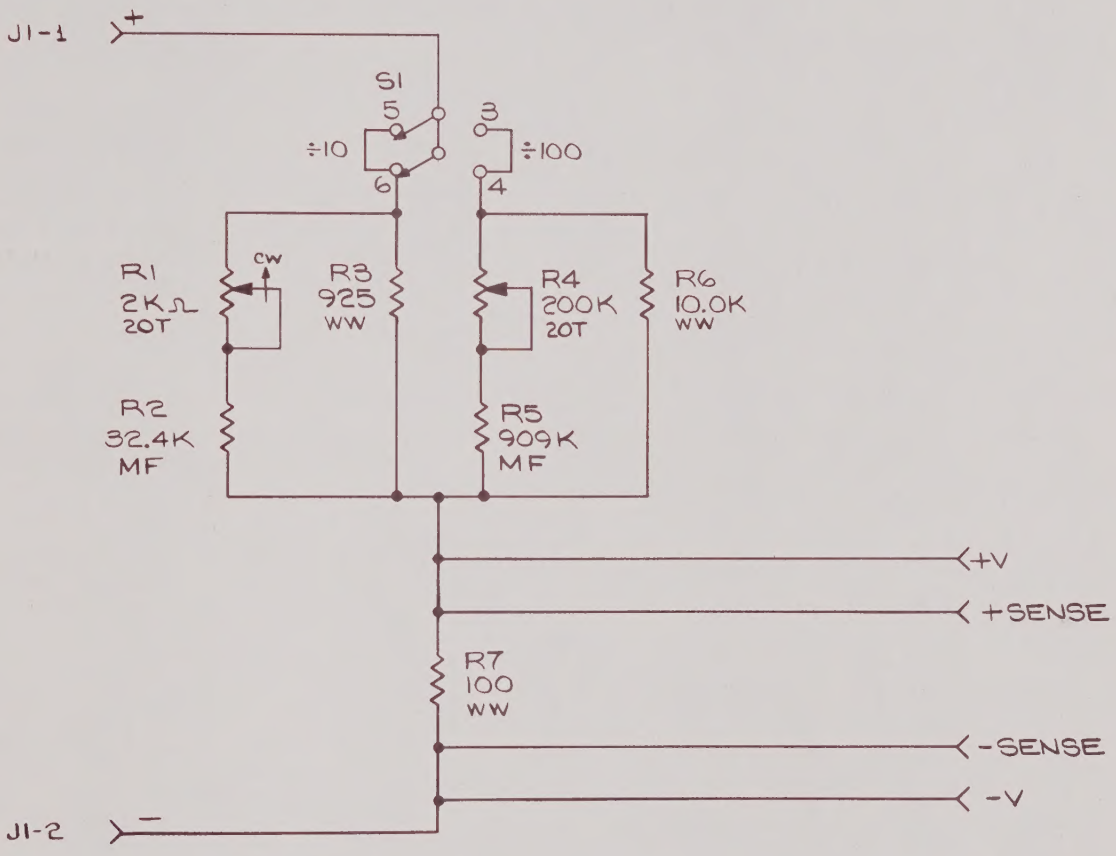

Figure 3. Divider PCB Assembly (cont)

Table 4. Fluke Technical Service Centers - U.S. and Canada

United States

CALIFORNIA
Burbank
Fluke Technical Center
2020 N. Lincoln St.
Zip: 91504
Tel. (213) 849-4641

Santa Clara
Fluke Technical Center
2300 Walsh Avenue
Zip: 95050
Tel. (408) 985-1200

COLORADO
Denver
Fluke Technical Center
1980 S. Quebec St.
Unit 4
Zip: 80231
Tel. (303) 750-1228

FLORIDA
Orlando
Fluke Technical Center
940 N. Fern Creek Ave.
Zip: 32803
Tel. (305) 896-2296

ILLINOIS
Rolling Meadows
Fluke Technical Center
1400 Hicks Road
Zip: 60008
Tel. (312) 398-5800

MARYLAND
Kensington
Fluke Technical Center
11501 Huff Court
Zip: 20795
Tel. (301) 881-6155

MASSACHUSETTS
Waltham
Fluke Technical Center
244 Second Ave.
Zip: 02154
Tel. (617) 890-1604

MINNESOTA
Minneapolis
Fluke Technical Center
10800 Lyndale Ave. So.
Zip: 55420
Tel. (612) 884-4541

NEW JERSEY
Clifton
Fluke Technical Center
460 Colfax Ave.
Zip: 07013
Tel. (201) 778-1339

NORTH CAROLINA
Greensboro
Fluke Technical Center
1310 Beaman Place
Zip: 27408
Tel. (919) 273-1918

TEXAS
Dallas
Fluke Technical Center
14400 Midway Road
Zip: 75240
Tel. (214) 233-9945

WASHINGTON
Mountlake Terrace
John Fluke Mfg. Co., Inc.
21707 66th Ave. W. Suite 1
Zip: 98043
Tel. (206) 774-2206

Canada

ALBERTA
Calgary
Allan Crawford Assoc. Ltd.
Fluke Technical Center
14-2280 39th N.E.
Zip: T2E 6P7
Tel. (403) 276-9658

ONTARIO
Mississauga
Allan Crawford Assoc. Ltd.
Fluke Technical Center
6503 Northam Drive
Zip: L4V 1J5
Tel. (416) 678-1500

QUEBEC
Longueuil
Allan Crawford Assoc. Ltd.
Fluke Technical Center
1330 Marie Victorin Blvd. E.
Zip: J4G 1A2
Tel. (514) 670-1212

Table 5. Sales and Service Locations - International

Supplied and supported by Fluke (Nederland) B.V., P.O. Box 5053, Zevenheuvelenweg 53, Tilburg, Netherlands.

EUROPE

AUSTRIA
*Walter Rekirsch Elektronische
Gerate GmbH & Co. Vertrieb KG
Liechtensteinstrasse 97/6
A-1090 Vienna, Austria
Tel. (222) 347646-0

BELGIUM
*C. N. Rood S/A
37 Place de Jamblinne de Meux
B-1040 Brussels, Belgium
Tel. (02) 27352135

CYPRUS
Chris Radiovision Ltd.
P.O. Box 1989
Nicosia, Cyprus
Tel. 66121

DENMARK
*Tage Olsen A/S
Ballerup Byveg 222
DK-2750 Ballerup
Tel. (01) 2-65 81 11

FINLAND
*Oy Findip AB
Teollisuustie 7
02700 Kauniainen
Helsinki, Finland
Tel. (080) 502255

FRANCE
*M. B. Electronique S.A.
Rue Fourney
ZAC de BUC
B. P. No. 31
78530 BUC, France
Tel. (01) 9563130

GERMAN FEDERAL REPUBLIC
*Fluke (Deutschland) GmbH
4-Dusseldorf
Meineckestrasse 53
West Germany
Tel. 211-450831

*Fluke (Deutschland) GmbH
8000 Munich 80
Vertriesburo Bayern
Rosenheimer Strasse 139
West Germany
Tel. 089-404061

GREECE
*Hellenic Scientific
Representations Ltd.
11 Vrassida Street
Athens 612, Greece
Tel. (021) 7792320

ITALY
*Sistrel S.p.A.
Via Giuseppe Armellini No. 39
00143 Rome, Italy
Tel. (06) 5915551

*Sistrel S.p.A.
Via Timavo 66
20099 Sesto S. Giovanni (Milan)
Italy
Tel. (02) 2476693

NETHERLANDS
*C.N. Rood, B.V.
Cort van der Lindenstraat 11-13
Rijswijk ZH2280AA
Netherlands
Tel. (070) 996360

NORWAY
*Morgenstierne & Co. A/A
Konghellegate 3
P.O. Box 6688, Rodelokka
Oslo 5, Norway
Tel. (02) 356110

PORTUGAL
*Equipamentos
De Laboratorio Ltda.
P.O. Box 1100
Lisbon 1, Portugal
Tel. (019) 976551

SPAIN
*Hispano Electronica S.A.
Poligono Industrial Urtinsa
Apartado de Correos 48
Alcorcon (Madrid), Spain
Tel. 09-341-6194108

SWEDEN
*Teleinstrument AB
P.O. Box 490
S-162 Vallingby-4
Sweden
Tel. (08) 380370

SWITZERLAND
*Traco Electronic AG
Jenatschstrasse 1
8002 Zurich, Switzerland
Tel. (01) 2010711

TURKEY
*Erkman Electronik Aletler
Necatibey Cad 92/2
Karakoy/Istanbul
Turkey
Tel. 441546

UNITED KINGDOM
*Fluke International Corp.
Colonial Way
Watford Herts WD2 4TT, England
Tel. (0923) 40511

MIDDLE EAST

EGYPT
Lotus Engineering Organisation
P.O. Box 1252
Cairo, Egypt
Tel. 71617

IRAN
*Irantronics Company Ltd.
20 Salm Road, Roosevelt Ave.
Tehran, Iran
Tel. 828294

ISRAEL
*R.D.T. Electronics
Engineering Ltd.
46, Sokolov Street
Ramat Hasharon 47235, Israel
Tel. 482311

JORDAN
Trading & Agricultural
Development Co.
P.O. Box 567
Amman, Jordan
Tel. 23052

KUWAIT
Tareq Company
P.O. Box Safat 20506
Kuwait, Arabian Gulf
Tel. 436100

LEBANON
Mabek
P.O. Box 11-3823
Beirut, Lebanon
Tel. 252631

MOROCCO
Mainvest
Residence Moulay Ismail
Bat.C Boulevard
Moulay Slimane, Rabat, Morocco
Tel. 276-64

SAUDI ARABIA
Electronic Equipment
Marketing Est.
P.O. Box 3750
Riyadh, Saudi Arabia
Tel. 32700

SYRIA
Mabek Electronics
C/O Messers G. Ghazzi
P.O. Box 4238
Damascus, Syria

*Technical Service Available

Customers in the following countries: Bulgaria, Czechoslovakia, Hungary, Poland, Romania, U.S.S.R. and Yugoslavia. Contact: Amtest Associates Ltd., P.O. Box 55, Addlestone, Surrey, KT 15 1DU, England, Tel. (0932) 52121

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